

***Health Consultation***

**Evaluation of Raw Dairy Cow Milk Samples,  
Lewis County Dairy Farm  
Chehalis, Lewis County, Washington**

July 31, 2000

**Prepared by  
Washington State Department of Health  
under cooperative agreement with the  
Agency for Toxic Substances and Disease Registry**



## **Foreword**

The Washington State Department of Health (DOH) has prepared this Health Consultation in cooperation with the Agency for Toxic Substances and Disease Registry (ATSDR). ATSDR is part of the U.S. Department of Health and Human Services and is the principal federal public health agency responsible for health issues related to hazardous waste. This health consultation was prepared in accordance with methodologies and guidelines developed by ATSDR.

The purpose of this health consultation is to identify and prevent harmful health effects resulting from exposure to hazardous substances in the environment. The health consultation allows DOH to respond quickly to a request from concerned residents for health information on hazardous substances. It provides advice on specific public health issues. DOH evaluates environmental sampling data, determines whether exposures have occurred or could occur, reports any potential harmful effects, and recommends actions to protect public health.

For additional information or questions regarding DOH, ATSDR, or the contents of this health consultation, please call the health advisor who prepared this document.

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## **Glossary**

### **Agency for Toxic Substances and Disease Registry**

The principal federal public health agency involved with hazardous waste issues, responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. ATSDR is part of the U.S. Department of Health and Human Services.

### **Carcinogen**

Any substance that can cause or contribute to the production of cancer.

### **Comparison value**

A concentration of a chemical used to select contaminants of concern which require further evaluation in the Health Assessment process. The terms comparison value and screening level are often used synonymously.

### **Contaminant**

Any substance or material that enters a system (the environment, human body, food, etc.) where it is not normally found.

### **Dose**

The amount of substance to which a person is exposed. It often takes body weight into account.

### **Exposure**

Contact with a chemical by ingesting, inhaling, or by direct contact (such as through the skin or eyes). Exposure may be short-term (acute) or long-term (chronic).

### **Groundwater**

Water found underground that fills pores between materials such as sand, soil, or gravel. In aquifers, groundwater often occurs in quantities where it can be used for drinking water, irrigation, and other purposes.

### **MCL**

Maximum Contaminant Level. A drinking water regulation established by the Safe Drinking Water Act. It is the maximum permissible concentration of a contaminant in water that is

delivered to the free-flowing outlet of the ultimate user of a public water system. MCLs are enforceable standards.

### **Model Toxics Control Act (MTCA)**

The hazardous waste cleanup law for Washington State.

### **Monitoring Wells**

Wells developed to collect groundwater samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants.

### **Health Consultation**

The evaluation of data and information on the release of hazardous substances into the environment in order to assess past, current or future impacts on public health, develop health advisories or other recommendations, and identify studies or actions needed to evaluate and prevent human health effects.

### **Source**

Origin of a contaminant released into the environment. If the source is unknown, the environmental media through which contaminants are presented at a point of exposure.

### **Volatile Organic Compound (VOC)**

An organic (carbon-containing) compound that evaporates (volatilizes) easily at room temperature. Many commonly used cleaning solvents contain VOCs

## Background and Statement of Issues

In late 1993 and early 1994, Department of Health (DOH) testing of local drinking water wells revealed that some shallow wells in the vicinity of Hamilton and Labree Road, south of Chehalis, were contaminated with tetrachloroethylene, also known as perchloroethylene (PCE), (see Figures 1 - 3).<sup>1</sup> Since 1993, PCE concentrations in the drinking water wells have ranged between 3 micrograms/liter ( $\mu\text{g/l}$ ) and 3,740  $\mu\text{g/l}$ .<sup>1</sup> PCE concentrations in area groundwater have been as high as 60,000  $\mu\text{g/l}$ .<sup>1</sup> The federal Safe Drinking Water Act Maximum Contaminant Level (MCL) for PCE is 5  $\mu\text{g/l}$  (40 CFR 141.61). PCE is a manufactured compound widely used for dry cleaning fabrics, as a metal degreaser, and as an intermediate in the manufacturing of other chemicals.<sup>2</sup>

When the drinking water well contamination was first discovered, the Lewis County Department of Public Health (Lewis County) and the Washington State Department of Ecology (Ecology) informed affected well owners of the test results and advised them to obtain alternate sources of drinking water. Ecology is currently supplying bottled drinking water for some of the families and businesses in the affected area, and is providing water treatment for one of the residences.

Ecology is in the process of identifying sources of PCE in the Hamilton/Labree Road area. Although PCE has been detected most frequently, and at the highest concentrations in the vicinity of the source areas, other volatile organic compounds (VOCs) have been detected in the shallow aquifer as well. In 1996 and 1999, DOH prepared Health Consultations evaluating past residential exposures to PCE, including an area resident (petitioner).<sup>3, 4</sup>

### **PCE Toxicity**

In 1987, the Environmental Protection Agency (EPA) proposed PCE as a probable human carcinogen. In light of more recent data, EPA reclassified PCE as a possible human carcinogen - probable human carcinogen continuum. An EPA workgroup is currently reassessing PCE carcinogenicity. Some studies suggest an association between exposure to PCE and various cancers, including bladder, kidney and liver cancer, and leukemia. Other liver and kidney effects have been observed after high dose laboratory animal exposures.

Because of the area groundwater contamination problem, the petitioner raised concerns about the drinking water supply for a dairy farm located in Lewis County. The petitioner has since moved to the city of Chehalis.<sup>5</sup> The petitioner's specific concern was that the "dry" cows (pregnant cows waiting to calf, prior to going into the milking herd) exposed to contaminated water, are producing "tainted milk." Prior to December 1999, the shallow, contaminated well (Well 4) provided water to these cows.<sup>6</sup> PCE concentrations in Well 4 have ranged from 138  $\mu\text{g/l}$  to 242  $\mu\text{g/l}$ .<sup>7</sup> To date, PCE has not been detected in the deep well used to serve the milk house, parlor, and the lactating (milk-producing) cows.

The petitioner initially contacted the local newspaper, which contacted Ecology. Ecology requested that the Washington State Department of Agriculture (WSDA) collect milk samples, and that the DOH evaluate the results of the analysis. There was no reason to believe PCE would be detected in the processed commercial milk product. Because of the cow's *past* exposures to PCE in their drinking water, WSDA decided to collect the raw milk samples anyway, as an assurance. *This Health Consultation describes the milk sampling methodology, and evaluates the results of the milk sample analysis.*

## **Discussion**

WSDA Food Safety Officers conducted an initial site visit to the dairy on December 16, 1999. Just prior to that time, the dairy-owner indicated that he had changed the "dry" cow's water source from Well 4 (the contaminated, shallow well) to the uncontaminated, deep well. Currently, the drinking water supply for the dairy operation is from the deep, uncontaminated well. After the dry cows have their calves, the cows are supplied water from the deep well. Milk from the cows that have recently calved (called clostrom) is fed to the calves. Once the cows begin their regular lactation, the milk is transferred into the bulk milk tank for subsequent processing and sale.<sup>6</sup>

## **Sampling Procedures**

Prior to sampling, all necessary arrangements were made with the dairy owner and WSDA Chemical and Hop laboratory in Yakima.

On February 7, 2000, WSDA visited the dairy to obtain the milk samples. WSDA's goal was to obtain milk samples from "fresh" (recently calved) cows. The milker "hand-milked" a cow that had calved the same morning, and a cow that had calved several days before. Each milk sample was placed into an autoclaved 250 milliliter (ml) sample collection bottle.

A third milk sample was obtained from the bulk milk storage tank, located in the milk house. Milk from the bulk tank is sold for processing into commercial milk products. A fourth, temperature control sample, was collected from the bulk milk storage tank. The temperature control sample was to be used by the lab as a quality control sample. All sample bottles were filled to reduce the headspace, and the chance for volatilization.

The filled sample containers were sealed, identified with a unique sample collection number, sample collection date, sampling time, and the inspector's initials. A sample collection report form was prepared for each sample. The filled sample containers were chilled in ice water immediately after collection, and transferred to an insulated shipping container later the same day. The container was shipped overnight by Federal Express to the WSDA Chemical and Hop Lab in Yakima.

## Results

*PCE was not detected in either of the milk samples obtained from the cows.* The laboratory method detection limit for the samples was 4 µg/l (just below the 5 µg/l federal drinking water standard established for PCE). WSDA informed the dairy-owner of the results. The lab did not analyze the bulk milk tank sample. Since PCE was not detected in the individual milk samples, it is unlikely that PCE would have been detected in the bulk milk tank sample. The results from testing for PCE in milk samples are listed in Table 1.

## Conclusions

Milk currently produced at the Lewis County Dairy Farm poses a *no public health hazard* due to PCE contamination. This conclusion is based upon the results of a one-time sampling for PCE only. WSDA was informed by the dairy owner that the cows were taken off of the contaminated water supply shortly before the sampling, so information about past exposures is not available.

Since all of the cows, and all dairy operations currently use water from the uncontaminated, deep well, and since PCE was not detected in the milk samples analyzed, there is no reason to believe that PCE will be a concern in the dairy milk in the future.

## Recommendations /Public Health Action Plan

1. The dairy owner should continue to supply uncontaminated drinking water to the dairy cows.
2. WSDA should provide DOH the results of subsequent milk samples, if collected, for review and evaluation.
3. DOH is available to evaluate additional data should it become available.

**TABLE 1**  
**PCE CONCENTRATIONS**  
**VEENHOUWER DAIRY COW RAW MILK SAMPLES**  
**FEBRUARY 7, 2000**

Sample	Concentration (µg/l)	★ ATSDR Health Comparison Value (µg/l)	Federal Drinking Water Standard (MCL) (µg/l)
“Dry” Cow # 1	ND	100	5
“Dry” Cow # 2	ND	100	5
Bulk Milk Storage Tank Milk House	Not Analyzed	100	5
Bulk Milk Storage Tank Milk House			

µg/l = microgram of chemical per liter of water (equals part per billion)

★Non-carcinogenic Comparison Value = ATSDR Child RMEG (Reference Dose Media Evaluation Guide)

MCL = Federal Safe Drinking Water Act Maximum Contaminant Level

ND = Not detected



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## References

1. Washington Department of Ecology. Source Investigation Report for Hamilton/Labree Roads Chlorinated Solvent Site, Chehalis, Washington. January 1999.
2. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Tetrachloroethylene (Update), U.S. Department of Health and Human Services, Public Health Service, September 1997.
3. Washington State Department of Health. Health Consultation: Evaluation of Contaminants in Residential Domestic Well Near the Hamilton/Labree Road PCE Site, Chehalis, Lewis County, Washington. August 27, 1999.
4. Washington State Department of Health. Health Consultation, Hamilton Road PCE, Chehalis, Lewis County, Washington, December 23, 1996.
5. Personal Communication with petitioner, January/February 2000.
6. Personal Communication with Jim Pressley, Washington State Department of Agriculture, January/February 2000.
7. Washington Department of Ecology. Hamilton/Labree Roads Chlorinated Solvents Site, PCE Results in Monitoring Wells and Private Wells, March 2000 update.
8. Henderer, John. Chehalis Mother Grateful to Have Clean Water. The Chronicle. December 31, 1999.
9. U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS), March 2000.
10. Personal Communication with Panjini Balaraju, Site Manager, Washington State Department of Ecology, Toxics Cleanup Program. January/February 2000.
11. Washington State Department of Agriculture. Summary of Milk-Testing Investigation., Jim Pressley, March 2000.
12. Yakima Chemical and Hop Lab. Chemist Report: Residue Analysis. Results of Raw Milk Samples, February 16, 2000.

## **FIGURES**

Insert Figure 1: General Map of Chehalis, WA. and vicinity

Insert Figure 2: Hamilton/Labree Roads Chlorinated Solvent Site Well Locations

Insert Figure 3: Demographic site map, Hamilton Road PCE site, Chehalis, WA.

## **CERTIFICATION**

This Lewis County Dairy Farm Health Consultation was prepared by the Washington Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

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